

**Course Syllabus**  
020MMDGS1 Continuum Mechanics

1. **Course number and name:** 020MMDGS1 Continuum Mechanics
2. **Credits and contact hours:** 4 credits, 3x1:15 course hours
3. **Instructor's or course coordinator's name:** Fouad Kaddah
4. **Textbook and other supplemental material:**
  - a. Instructor's course notes
  - b. Traite de Génie Civil de l'Ecole polytechnique fédérale de Lausanne Volume 3: Analyse des structures et milieux continus; Mécanique des solides ; Auteurs Francois Frey.
  - c. Mécanique de l'ingénieur Tome 2 : milieux continus ; Tome 3 : Solides déformables ; Auteur : Yves Bamberger ; Editions : Hermann
  - d. Mécanique des structures Tome 1 2e Edition: Solides Elastiques et Plaques et Coques; Auteurs: S. Laroze et J.-J. Barrau ; Eyrolles Masson 1988
  - e. Analyse des solides déformables par la méthode des éléments finis; Auteurs: Marc Bonnet et Attilio Frangi; les éditions de l'Ecole Polytechnique de France
  - f. Finite Element Procedures, Klaus-Jurgen Bathe, Massachusetts institute of Technology
  - g. Modélisation par éléments finis, 3ème Edition; Auteur: Jean Charles Craveur, Dunod
5. **Specific course information**
  - a. **Catalog description:** Introduce the assumption of continuity of mater, assimilate the notions of stresses and strains and the stress/strain relationships; provide the calculation methods according to the theory of elasticity.
  - b. **Prerequisites:** 020CDINI3 Differential and integral calculus, 020ALLNI2 Linear Algebra, 020MC2NI3 Solid mechanics, 020STANI4 Statics
  - c. **Required/Elective/Selected Elective:** Required major course for Civil Engineering Specialty students.
6. **Specific goals for the course**
  - a. **Specific outcomes of instruction:**
    - Know how to formulate a problem of deformation of a solid
    - Assimilate the theory of elasticity, widely used in design
    - Understand the stress path in a structure
  - b. **KPIs addressed by the course:**

| KPI           | a2 | c1 | e2 | e3 | k1 | k2 |
|---------------|----|----|----|----|----|----|
| Covered       | x  | x  | x  | x  | x  | x  |
| Assessed      |    |    |    |    |    |    |
| Give Feedback |    |    |    |    |    |    |

7. **Brief list of topics to be covered and approximate number of lectures:**
  1. General introduction to the continuum mechanics (3 hours)
  2. Kinematics of a continuum (8 hours)
  3. Dynamics of a continuum (8 hours)
  4. Thermodynamic of a continuum and Stress/strain relationships (8 hours)
  5. Equations of the infinitesimal theory of elasticity (7 hours)
  6. Variational principles in mechanics (2 hours)